

## Our Green Mountain Home – A Consumer’s Perspective

*Ann Parker, and her husband Ron, recently completed their retirement home – a sustainably built 2,700 square foot two story hybrid timber frame home in Woodland Park, Colorado. This is her story.*

“I have always dreamed of settling down and celebrating our retirement with our children and grandchildren. As an Air Force family, we saw the world and moved constantly. I served our country as an intelligence officer and my husband Ron worked as an internet marketing communications consultant. We are empty nesters, yet both still work part time. Our daughter is married and living in Texas, and our son is just finishing college in Indiana. While I don’t consider myself an environmentalist, I drive a hybrid car for the economic benefit. Anticipating our retirement, Ron and I discussed building a sustainable traditional home which is both comfortable and energy efficient. We liked the ambiance of large wooden beams, yet suspected a timber frame structure was outside our budget. In 2010, we purchased a wooded lot with a view of Pike’s Peak and began our search for an architect and builder.

Finding professionals who understood our perspective was more challenging than we expected. From web research, we engaged an architect who was a LEED accredited professional and touted his expertise in green building. However, the conceptual designs he created were steel and glass – making a statement for post modern architecture – but not our home in the woods. Most builders advertised they had Built Green certification, yet did not propose anything substantial beyond Energy Star® rated appliances. Attempting to find a timber frame company was equally challenging. When we filled out an on-line form asking for information, we were bombarded with calls and emails from a dozen companies. A few days later, our mailbox was filled with large glossy brochures of million dollar timber frame homes in the northeast. These timber frame homes did not fit within our \$425,000 budget. What I found ironic was that most companies promoting sustainable design offered McMansions using beetle-kill beams or recycled timbers, yet offered little more than mainstream home builders. The two story great rooms were impressive. I did not want to impress. I wanted a modest, yet elegant two story home which was appropriate for the site, comfortable to live in and had predictable energy bills. Of particular concern to me was the high cost of propane, as our lot did not have access to natural gas. What we needed was a designer who understood traditional architecture and modern building science; and a builder who was local, had experience with timber frames, understood energy efficient construction, was adept at value engineering and would be a single point of contact for the project.

After a series of missteps, we found the ideal partner at the Denver Home Show. Lane Edwards, the principal of Treading Lightly Timber Frames in Boulder, communicated that our dream was possible within our budget. He explained that he would help us put together an integrated design/build team who could implement our vision. Lane had run a small timber frame shop for ten years and was a competent designer and builder. With the downturn in the economy in 2007, Lane and his crew began finishing basements to survive. Lane attended a Guild Conference in 2008 which gave him the motivation to take courses in project management, building science and enclosure systems, sustainable heating and cooling systems, and renewable energy.

He began offering design services which incorporated these methods. While he had minimal interest as a general contractor, he offered project management of the overall structure and teamed with a local geothermal company to provide energy efficient heating, cooling, ventilation and hot water. In 2012, Lane added Solar City to his team – offering solar photovoltaic systems to his clients via leases at no additional first cost. Rather than extolling the virtues of a specific technology, Lane promoted the benefits that were most important to us:

- ✓ elegant architecture,
- ✓ absolute comfort,
- ✓ energy efficient low maintenance appliances and heating and cooling systems
- ✓ superior indoor air quality with no toxic emissions, and
- ✓ predictable energy bills.

Lane felt it was imperative that the general contractor was familiar with the local area, subcontractors, and building department, so he worked with us as a consultant to evaluate and select Platinum Homes, a residential general contractor in Woodland Park. Treading Lightly Timber Frames accepted overall responsibility for the building performance: building envelope and sustainable systems; while Platinum Homes managed everything else.

After Federal renewable energy tax credits, we built an elegant 2,700 SF low energy home with a partial basement for \$428,000, at a cost of \$158 per square foot. While the first cost was 7% higher than a conventional house with fossil fuel heating and cooling, the internal rate of return on this investment is 18%. Our utility bills are less than \$500 per year with solar electric panels offsetting \$90/month of electrical use. The architecture is traditional for a Colorado cabin, yet stunning with the views of Pike's Peak to the south, and a 2 ½ story turret illuminating the interior with natural daylight from the north.



***The hybrid home was value engineered to use timber frame trim (rafter tails and gable detail) to reinforce the timber framed porch and center turret with clerestory windows for daylighting. Timber frame by MacDonald & Lawrence. "Timber framing" by Brewster Timber Frame Company. Photo by Al Wallace.***

No artificial lighting is required when the sun is out. Our house is oriented to provide passive solar heating in the winter and shading in the summer. The open floor plan is ideal for us in retirement: the master suite and bath are on the first floor adjacent to the living and dining areas. Three extra bedrooms for our children and guests are upstairs with their own heating and cooling zones. We left the basement unfinished as a play area for our grandchildren, and with separate areas for storage and the mechanical systems. Our living room is grand with a low emissions EPA Phase II wood-burning fireplace centered in a massive stone hearth and chimney.

The mechanical systems are integrated to provide high comfort and excellent air quality, as well as a level of security in the event of a power outage. We have an in-floor radiant heating system which maintains the room temperature to within 1 degree of the thermostat, and every room has its own radiant floor heating zone. Fresh air is provided 20 minutes every hour using an energy recovery ventilator which also helps maintain acceptable indoor humidity. The air is continually filtered, removing 90% of the particulates 1/30<sup>th</sup> the size of a human hair while using less energy than a standard incandescent light bulb. This air quality reduces my allergy symptoms, and minimizes our cleaning tasks by filtering out dust and indoor particulates.

The high performance walls and roof systems use less than one half the energy of a conventional home. Our primary cooling, and back up heating, is provided by a ground source heat pump. The same ground heat exchanger is used to power a small heat pump for domestic hot water at about the same cost as a tankless hot water heater but at four times the efficiency.

In the event of a power failure, our fireplace will provide primary heating with the heat distributed throughout the house by the heat pump fan through the ductwork. A small propane generator provides the electricity to power the whole house heat pump fan using only 80 watts, the fireplace fan, the refrigerator, igniter for the propane cook top and dedicated circuits for LED safety lighting, phone and internet throughout the home. Except during a power failure and excluding the propane cook top and fireplace, our house has a zero carbon footprint and emits no toxic gases attributed to heating, cooling and hot water.

While I dreamed of spending our retirement in a beautiful home with comfort and space for our extended family and friends, I never imagined that this structure would be so planet friendly. I am proud of the legacy we leave for our grandchildren: a healthy, safe, accessible and pleasant built environment that enhances the quality of their lives.”

Ann Parker  
Colonel, USAF Retired

*End note*

*The above story is a work of fiction created to challenge the assumptions we make about sustainable design, the built environment, and timber framing. Ann's story is representative of the largest and fastest growing consumer market for custom homes in the United States – upper middle class baby*

*boomers. As a designer, builder or timber framer, how do your service offerings address the needs of this market, and how do you communicate your capabilities in a context these potential clients understand? For those readers who are building your retirement home, imagine what is possible and seek out the team to build your dream.*

Al Wallace